

XL403D Digital Accelerometer

Rugged ± 1 g to ± 15 g
Dynamic Interface
Built-in Analyses

Advanced Digital Accelerometer

Measurement Specialties' XL403D accelerometers offer precision measurements while additionally performing basic functions within the sensor. Reduce the need for post-processing time and equipment plus shrink data file sizes; simply request minimum or maximum values, peak-to-peak, magnitude, tilt, or threshold. The output is configurable by the user – choose number of axes, units returned, bandwidth, sample rates, function specifics, and analysis results.

Accuracy is improved by minimizing variations due to temperature and aging effects, and their tough, compact housing holds potted electronics.

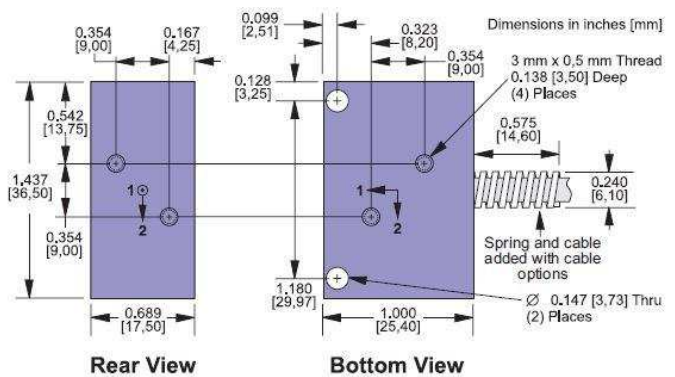
Choose the number of axes and specify any range option up to ± 15 g to best suit your application.

Users are supplied with a calibration certificate listing sensitivity and offset for each sensor. Custom versions can be provided.



✓RoHS

dimensions



FEATURES

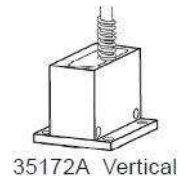
- Built-in Analyses
- Dynamic Customer Interface
- Flexible Output
- High Accuracy and Linearity over Wide Temperature Range
- Rugged for Harsh Environments
- Built-in Power Supply Regulation
- Easy Installation
- Three Year Warranty

APPLICATIONS

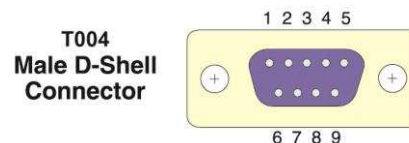
- Vehicle dynamics
- Construction Equipment
- Research & Development
- Test & Measurement
- Military/Aerospace

Two through holes and four 3 mm x 0.5 mm threaded holes are provided for mounting.

Mounting
adapters
(sold
separately)



connections



Pin	1	2	3	4	5	6	7	8	9
Signal	A1+	A2+	A3+	Signal -	RS485-	RS485+	ST/Aux	+Vs	Gnd
Wire	Brown	Red	Orange	Yellow	Green	Blue	Violet	Grey	White

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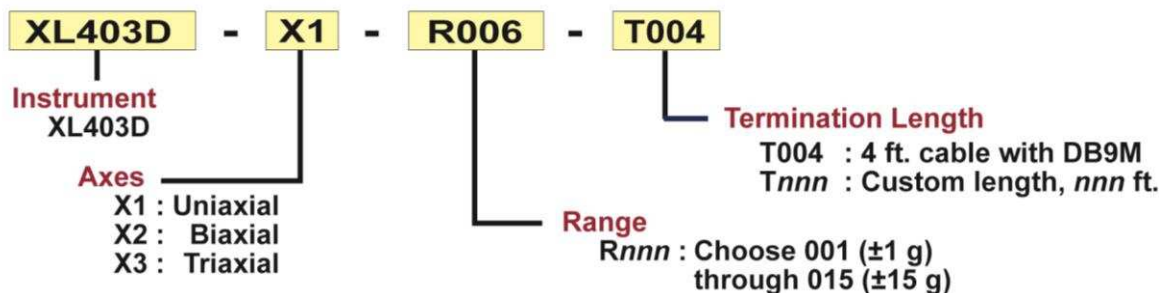
performance specifications

$T_A = T_{min} \text{ to } T_{max}$; $8.5 \leq V_S \leq 36 \text{ V}$; Acceleration = 0 g unless otherwise noted; within one year of calibration. Improved specifications available upon request.

PARAMETERS	Min	Typical	Max	Units	Conditions/Notes
Range: Measurement Full Scale	±1		±15	g	On each axis. Must specify via Option Rnnn
Sensitivity					
At 25°C, Option R005		400*		mV/g	Precise values on cal certificate
Drift T_{min} to T_{max}		±0.65	±3	%	Percent of sensitivity at 25°C
Zero g Bias Level					
At 25 °C		2.5		V	Precise values on cal certificate
Drift to T_{min} or T_{max}		±10	±20	mg	At <1.25°C/min. temperature rate of change
Alignment					
Deviation from Ideal Axes		±1.0	±2.0	degrees	Precise values on cal certificate. Can be compensated if required
Transverse Sensitivity		±0.25		%	Inherent sensor error, excluding misalignment
Nonlinearity		±0.1	±0.25	% FSR	Best fit straight line
Frequency Response , 5-pole	0		800	Hz	Upper cutoff per User selection, -3 dB pt ±10%
Noise Density		100		µg/√Hz	10 Hz to 400 Hz
Self-Test Pull-Up Resistor	5			kΩ	Logic "1" ≥3.5 V, Logic "0" ≤1.5 V; "0" causes self-test
Temperature Sensor			±0.2	°C	Accuracy ±1 °C
Scan Rate	0.0007		2500	scans/sec	Default scan list (A1, A2, A3, T1)
ADC Resolution		10		bits	
Absolute Accuracy		±2		LSB	
Outputs					
Output Voltage Swing	0.5		4.5	V	$I_{out} = \pm 0.5 \text{ mA}$
Capacity Drive Capability		1000		pF	
Power Supply (V_S)					
Input Voltage Limits	-80		+80	V	-80 V continuous, >38 V if ≤550 ms, duty <1%
Input Voltage - Operating	+8.5		+36	V	Continuous
Input Current		25		mA	
Rejection Ratio		>120		dB	DC
Temperature Range (T_A)	-40		+85	°C	
Mass		38		grams	Precise values on cal certificate
Shock Survival	-5000		+5000	g	Any axis for 0.5 ms, powered or unpowered

*Scale linearly with range option Rnnn; see Ordering Information

ordering info



Please note: PC Interface kit is required for digital sensor

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setup

Use the 35250AK0/AK1 interface kit (sold separately) to connect the XL403D to a computer with a serial port and supply power (USB adapters available if needed). Use an ASCII terminal emulator of your choice to interface with the sensor (Tera Term Pro is recommended).

Sample Commands

Set Commands		Query Commands	
ROUT:SCAN	set channels to be scanned	IDN?	device identification
		ROUT:SCAN?	channels being scanned
INP:FILT:FREQ	set cutoff frequency	READ?	show single scan
TRIG:SOUR:TIM	set time-based scan	INP:FILT:FREQ?	current cutoff filter setting
TRIG:COUNT	set maximum number of triggers	TRIG:SOUR?	current trigger source
INIT	begin scanning as configured	TRIG:COUNT?	current max number of triggers
OUT:FMT	format output	SYST:ERR?	current error status
CONF:FNC <name>	configure function	OUT:FMT?	current formatting
		CONF:FNC?	current function definitions

```

Tera Term - COM1 VT
File Edit Setup Control Window Help
out:fmt?
FLT,Units
read?
0.013g,-0.002g,-1.006g, 28.5°C
out:fmt hex
read?
0203,01FF,01c1,0272
out:fmt flt,units,cnt
read?
0004,-0.005g,-0.002g,-1.024g, 28.8°C
read?
0005,-0.023g, 0.016g,-1.024g, 28.5°C
out:fmt hex,cnt,crc
read?
0006,0201,01FF,01c1,0272,380c
read?
0007,0201,01FF,01c1,0272,F4dc
read?
0008,0201,0200,01c1,0274,969c
  
```

Display engineering units (FLT), HEX values; add a scan count or CRC to each scan

XL403D Functions

Configure XL403D's built-in functions to execute as needed. Each unique function is performed on the scan measurements, with results maintained internally within the sensor.

MIN – tracks the minimum reading on each channel since the function was configured

MAX – tracks the maximum reading on each channel since the function was configured

MAG – calculates the magnitude of the vector sum of axes A1, A2 and A3

PTP – tracks the peak-to-peak value for each channel since the function was configured. This is equal to MAX – MIN for each channel

TLT – calculates the 2-axis tilt angle for any 2 axes that are in scan

TH1 – tracks channels readings against individual channel threshold values

TH2 – tracks MAG or TLT values against a threshold

OU1/OU2/OU3 – output functions that print the values of functions on a configurable periodic basis

When the XL403D threshold function is set, external controls can be triggered when the threshold is reached. Receive a warning, flip a switch, apply a brake - take action immediately when limits are exceeded.